	Temperature determined calorimetrically.	Specific gravity of the vapour of thallium chloride.
Experiment I.....	859°	8·15
„ II.....	828°	8·28
„ III.....	1015°	8·06
„ IV.....	859°	7·43
„ V.....	1026°	8·75
„ VI.....	852°	8·60
„ VII.....	837°	7·84

The specific gravity of thallium chloride vapour calculated upon the supposition that the molecular weight of the compound is 238·07, and its formula TlCl, is 8·49.

Four determinations of the specific gravity of mercury vapour made simultaneously with four of the above experiments gave as a mean the number 6·0 instead of 6·728.

The specific gravity of the vapour of lead chloride was made in a similar way, but the temperature required for complete volatilization is much higher than that needed in the case of the last compound. The residue left in the globes was completely soluble in hot water, and contained lead and chlorine in the proportion of one atom of the former to 2·08 of the latter.

	Temperature determined calorimetrically.	Specific gravity of the vapour of lead chloride.
Experiment I.....	1046°	9·12
„ II.....	1089°	9·72
„ III.....	1077°	9·51
„ IV.....	1070°	9·64

The specific gravity calculated from the formula $PbCl_2$=277·14 is 9·62.

I hope before long to be able to lay before the Society the results of specific gravity determinations of the vapours of other compound and elementary bodies, together with the whole of the experimental details.

VIII. "Extract from Report to Professor Sir Wyville Thomson, F.R.S., Director of the Civilian Scientific Staff, on the Brachiopoda dredged by H.M.S. 'Challenger.'" By Thomas Davidson, F.R.S. Received May 8, 1878.

At the request of Professor Sir Wyville Thomson, I have undertaken the examination, description, and illustration of the Brachiopoda dredged by the 'Challenger' Expedition.

Very little seems to have been known with respect to recent Brachi-

opoda before the middle of last century; and even during the period extending from 1750 to 1800, the information relating to the recent species was, with some exceptions, meagre and often unsatisfactory.

A Brachiopod, until within the last fifty years, was considered a great rarity in all collections, and no one could boast of possessing more than a very limited number of species and specimens. Much uncertainty was also felt as to their nature, and the position they should occupy among the Invertebrata. They were generally supposed to be referable to the genus *Anomia*, and were very quaintly described by some of the earlier naturalists. Several more serious and better informed observers appeared soon after 1753, such as Linné, Pennant, Müller, Lamanon, Pallas, Grundler, and a few others, who were able, in a measure, to prepare the way for the important discoveries reserved for the more favoured naturalists of the present century.

The animal of the Brachiopod had attracted the attention of Pennant in 1766, Grundler in 1774, Müller in 1776, Poli in 1791, Lamanon and Cuvier in 1797; but no regular anatomical dissections had been executed, and their observations seemed, in a great measure, to be limited to the labial appendages, mantle, and some other minor details.

This most important inquiry was, however, subsequently admirably followed out by such excellent zoologists and anatomists as Cuvier, Owen, Huxley, Vogt, Macdonald, Hancock, Gratiolet, Lacaze-Duthiers, King, E. Deslongchamps, and others, to whose works the reader is referred, as it would not be possible in the limited space devoted to the description of the species dredged in the 'Challenger' Expedition, to write a treatise on the history of the class, nor to refer to the fossil genera and species, which vastly outnumber those inhabiting the present seas.

Restricting ourselves, therefore, to the recent species, we may observe that the correct knowledge we now possess with respect to their geographical and bathymetrical distribution is mainly due to the numerous Governmental and private dredging expeditions carried out during the last forty years. Before that period, very few reliable data were in our possession; and as these dredging expeditions proceed, the more will our knowledge become extended.

The admirable report of Professor E. Forbes, "On the Mollusca and Radiata of the Ægean Sea," published by the British Association for the Advancement of Science, for 1843, shadowed forth the important results that might be obtained by well conducted and equipped Expeditions; but even now we are wanting in information with respect to the bathymetrical distribution of some twenty-six of the known living species.

In his excellent memoir, "Uber die Wohnsitze der Brachiopoden,"

1859, Professor E. Suess recapitulates all the then known data respecting the geographical distribution and depths at which Brachiopoda live; since then, our knowledge has been very considerably extended; and it has become evident from direct observation that the Brachiopoda are widely but sparingly distributed over the depths of the sea, though of course they are more numerous both in species and individuals at depths of less than 500 fathoms. They are much localised, and prefer rocky, stony, and coralline sea bottoms, to soft or muddy ones.

The entire collection of Brachiopoda brought home by the 'Challenger' Expedition, numbering several hundred specimens, was placed in my hands by Sir Wyville Thomson, on the 11th of August, 1877. The specimens were in an excellent state of preservation, and had been put into bottles of spirits, with a correct indication of the stations, latitude, longitude, depth, bottom-temperature, and the nature of the sea-bed whence they had been obtained. Thus, reliable and invaluable data accompanied each specimen, which I have in every instance reproduced in the pages relating to this Expedition. Sometimes but one specimen had been dredged at a station, while at other times two or more species or specimens were brought to the surface. It must, however, be noted that, in addition to the 361 dredging stations included in the printed instructions, the naturalists of the 'Challenger' dredged very often in shallow water.

We learn from the "list of observing stations," recorded during the voyage of 68,890 miles, that there were 354 of such stations, at most of which "a fair sample of the bottom fauna was collected by means of the dredge or trawl." But Brachiopoda do not appear to have been obtained more than thirty times. Although the number of specimens was large, they represent 28 or 29 species only. The greatest depth at which any living Brachiopod was obtained was 2,600 fathoms, the greatest depth dredged being, on one occasion, 4,575 fathoms.

The ranges of depth at which the 'Challenger' species of Brachiopoda occurred, were as follows:—

Shore or low water to 10 fathoms.	Waldheimia flavescens. *Lamark.*
,,	Kraussina Lamarckiana. *Davidson.*
,,	Lingula anatina. *Lam.*
,,	Megerlia sanguinea. *Chemnitz.*
5 to 15 fms.	Magasella flexuosa. *King.*
25 ,, 30 ,,	Terebratella dorsata. *Gmelin.*
38 ,, 49 ,,	Terebratulina cancellata. *Koch.*
49 ,,	Discina stella. *Gould.*
51 ,, 150 ,,	Terebratulina caput-serpentis, var. septentrionalis. *Couthouy.*
70 ,, 75 ,,	Megerlia truncata. *Linné.*
70 ,, 75 ,,	Argiope decollata. *Chemn.*
82 ,,	Terebratulina sp. (?) Philippines.

82	to 102	fms.	Terebratella sp. (?) perhaps T. Frieli. *Dav.*
100	150	„	Platydia anomioïdes. *Scacchi.*
100	„ 150	„	Waldheimia Kerguelensis. *Dav.*
120		„	Megerlia Willemoesi. *Dav.*
120	„ 600	„	Terebratula uva. *Brod.*
150		„	Terebratula vitrea, var. minor. *Philippi.*
150		„	Kraussina pisum. *Lam.*
150		„	Rhynchonella nigricans, var. pixidata. Willemoes Suhm M.S.
210		„	Terebratula Moseleyi. *Dav.*
350		„	Terebratulina Cailleti. *Crosse.*
390		„	Magasella, sp.
390		„	Terebratulina Wyvilli. *Dav.*
420		„	Terebratula Cubensis. *Pourtales.*
600		„	Terebratulina Murrayi. *Dav.*
1,340		„	Terebratella Frieli. *Dav.*
1,875		„	Terebratula or Terebratulina (?) Dalli. *Dav.*
1,850		„	Megerlia (?) incerta. *Dav.*
1,850	to 2,180	„	Discina Atlantica. *King.*
1,035	„ 2,600	„	Terebratula Wyvilli. *Dav.*
1,900		„	Terebratula ? (undeterminable fragments).
2,160		„	Waldheimia Wyvilli. *Dav.*

The following table shows approximately how many times Brachiopoda were dredged at certain depths :—

99	dredgings in depths of from		1	to 500	fms.	21 times.
30	„	„	501	„ 1,000	„	4
47	„	„	1,001	„ 1,500	„	3
47	„	„	1,501	„ 2,000	„	4
92	„	„	2,001	„ 2,500	„	1
83	„	„	2,501	„ 3,000	„	1 (at 2,600 fms.)
5	„	„	3,001	„ 3,500	„	none
5	„	„	3,501	„ 4,000	„	none
none	„	„	4,001	„ 4,500	„	none
1	„	„	4,501	„ 4,575	„	none

Thus, it becomes apparent that Brachiopoda do not generally abound in depths exceeding 500 or 600 fathoms, or less; but out of 125 dredgings, in depths of from 1 to 600 fathoms, Brachiopoda were brought up twenty-one times only; while in depths varying from 600 to 2,600 fathoms, Brachiopoda were obtained ten or eleven times. The depths for some of the species, however, varied in localities not visited by the 'Challenger,' as recorded in the general list.

In order to obtain some approximate data as to the depths Brachiopoda are at present known to inhabit, it will be desirable to append a list of all the known recent species, with an indication of all their respective depths.

A point of interrogation has been placed before uncertain species, or not sufficiently determined species or varieties; and an asterisk before those dredged in the 'Challenger' Expedition.

CLISTENTERATA. *King.*

Depths in fathoms hitherto ascertained.†			
5 to 1,456	*Terebratula* vitrea. *Born.*		
292 „ 994	„ „ var. sphenoïdea. *Phil.*		
40 „ 1,000*	„ „ „ minor. *Philippi.*		
55 „ ?	„ „ „ Davidsoni. *Adams.*		
(?) „ ?	„ „ „ Cernica. *Crosse.*		
100 „ 420*	„ Cubensis. *Pourtales.*		
210 „ *	„ Moseleyi. *Dav.*		
500 „ 600	„ subquadrata. *Jeffreys.*		
10 „ 600	„ uva. *Broderip.*		
1,035 „ 2,600*	„ Wyvilli. *Dav.*		
1,875 „ *	„ Dalli. *Dav.*		
(?) „ ?	? Malvinæ. *D'Orb.*		
390 „ *	*Terebratulina* Wyvilli. *Dav.*		
30 „ 40*	„ cancellata. *Koch.*		
(?)	„ radiata. *Reeve.*		
46 „ 50	„ (Agulhasia) Davidsoni. *King.*		
0 „ 1,180	„ caput-serpentis. *Linné.*		
51 „ 130*	„ „ „ „ var. septentrionalis. *Couthouy.*		
50 „ 130	„ „ „ „ var. Mediterranea. *Jeffr.*		
82 „ *	„ undetermined (Philippine Islands).		
55 „ 58	„ Japonica. *Sowerby.*		
26 „ 63?	„ Cumingi. *Dav.*		
500 „	„ trigona. *Jeffr.*		
340 „ 795	„ tuberata. „		
70 „ 471*	„ Cailleti. *Crosse.*		
Low water „ 100	„ unguiculata. *Carpenter.*		
600 *	„ Murrayi. *Dav.*		
8 „ 25	*Gwynia* capsula. *Jeffr.*		
Shore „ 10†	*Waldheimia* flavescens. *Valenciennes.*		
5 „ 50	„ venosa. *Solander.*		
5 „ 690	„ cranium. *Müller.*		
1,450	„ tenera. *Jeffr.*		
2,160 „ ?*	„ Wyvilli. *Dav.*		
100 „ 150*	„ Kerguelensis. *Dav.*		
110 „ 200	„ Floridana. *Pourtales.*		
15	„ lenticularis. *Deshayes.*		
75 „ 725	„ septigera. *Loven.*		
(?) ?	„ Raphaelis. *Dall.*		
7 „ 50	„ Grayi. *Dav.*		
25 „ 90*	*Terebratella* dorsata. *Gm.*		
From low water to 45 fms.	„ frontalis. *Middendorf.*		
21 to 55	„ Mariæ. *Adams.*		
7 „ 50	„ coreanica. *Adams.*		
(?) ?	„ Bouchardi. *Dav.*		
15 ?	„ cruenta. *Dillwyn.*		

† The range of depth of the European and North Atlantic species has been given me by Dr. Gwyn Jeffreys.

Depths in fathoms hitherto ascertained.	
Near low water mark to 50 fathoms.	*Terebratella* occidentalis. *Dall.*
5 to 50?	„ pulvinata. *Gould.*
82 „ 1,340*	„ Frieli. *Dav.*
15	„ rubicunda. *Sol.*
20 „ 600	„ Spitzbergensis. *Dav.*
(?)	„ rubiginosa. *Dall.*
Low water to about 30 fms.	„ transversa. *Sow.*
(?) ?	? Labradorensis. *Sow.*
(?) ?	? Algoensis. *Sow.*
(?) ?	„ Lamenoni. *Schrenk.*
5 to 15*	*Magasella* flexuosa. *King.*
60 ?	„ Gouldi. *Dall.*
26 ?	„ Adamsi. *Dav.*
Low water to 10 fms.	„ Aleutica. *Dall.*
(?)	„ crenulata. *Sow.*
15 ?	„ Evansi. *Dav.*
15 ?	„ inconspicua. *Sow.*
5 to 50?	„ lævis. *Dall.*
5 „ 50	„ Patagonica. *Gould.*
Lowest spring tides ?	„ radiata. *Dall.*
(?) ?	„ suffusa. *Reeve.*
(?)	? Cumingi. *Dav.*
15 to 120	*Laqueus* Californica. *Koch.*
40 „ 85	„ picta. *Ch.*
35	„ rubella. *Sow.*
10 „ 292*	*Megerlia* truncata. *Linné.*
20 „ 292	„ var. monstruosa. *Scacchi.*
1,850 *	? incerta. *Dav.*
15 „ 345?	„ Jeffreysi. *Dall.*
10 „ 63*	„ sanguinea. *Ch.*
150 *	„ Willemoesi. *Dav.*
(?)	*Kraussina* rubra. *Pallas.*
150 *	„ pisum. *Lam.*
(?) ?	„ cognata. *Ch.*
Shore to 10 fms. *	„ Lamarckiana. *Dav.*
Shore to tide mark	„ Davidsoni. *Vélain.*
(?)	„ capensis. *Adams* and *Reeve.*
10 to 15	*Bouchardia* rosea. *Mawe.*
(?) ?	? fibula. *Reeve.*
40 „ 600*	*Platydia* anomioïdes. *Sc.*
90 „ 100?	? Davidsoni. *E. Desl.*
59 „ 95?	? lunifera. *Phil.*
18 „ 364*	*Argiope* decollata. *Chem.*
20 „ 45	*Cistella* cistellula. *S. V. Wood.*
40 „ 130	„ Neapolitana. *Sc.*
150 ?	„ biplicata. *Sequenza.*
17 „ 150	„ Barrettiana. *Dav.*
(?) ?	„ var. lutea. *Dall.*
60	„ Woodwardiana. *Dav.*
28 „ 200	„ cuneata. *Risso.*

Depths in fathoms hitherto ascertained.	
200 to 250?	*Cistella* Schrammi. *Crosse.*
30 „ 43	„ „ var. rubrotincta. *Dall.*
30 „ 300	*Thecidium* Mediterraneum. *Risso.*
60	„ Barretti. *Woodward.*
650 „ 1,443	*Atretia* gnomon. *Jeffr.*
10 „ 690	*Rhynchonella* psittacea. *Gmelin.*
690	„ Sicula. *Seq.*
15 „ 150	„ nigricans. *Sow.*
150 *	„ „ var. pixidata. *Willemoes Suhm* M.S.
(?)	„ Grayi. *Woodward.*
48 „ 100	„ lucida. *Gould.*
	TRETENTERATA. *King.*
3 to 808	*Crania* anomala. *Müll.*
71	„ Japonica. *Ad.*
Low water	„ Suessi. *Reeve.*
6	*Discina* striata. *Schumacher.*
5 to 9	„ (*Discinisca*, Dall) lamellosa. *Brod.*
6	„ „ lævis. *Low.*
6	„ „ Cumingi. *Brod.*
(?)	„ „ Antillarum. *D'Orb.*
17 „ 49*	„ „ stella. *Gould.*
690 „ 2,400*	„ „ Atlantica. *King.*
(?) ?	„ tenuis. *Sow.*
Shore, low water*	*Lingula* anatina. *Lam.*
Shore to 7 fms.	„ exusta. *Reeve.*
(?)	„ hians. *Swainson.*
(?)	„ hirundo. *Reeve.*
7 ?	„ jaspidea. *Ad.*
10	„ lepidula. *Ad.*
(?)	„ Reevi *Dav.*=L. ovalis. *Reeve.*
10	„ smaragdina. *Ad.*
7	„ Adamsi. *Dall.*
(?) ?	„ affinis. *Hancock.*
Shore to 7 fms.	„ tumidula. *Reeve.*
Shore to 7 fms. ?	„ Murphiana. *King.*
Shore	*Glottidia* Antillarum. *Reeve.*
(?) ?	„ Audebarti. *Brod.*
Tidal mud flats at lowish water.	„ Palmieri. *Dall.*
7 to 60	„ albida. *Hinds.*
Low flats and lowest water	„ pyramidata. *Stimpson.*
17 ?	„ semen. *Brod.*

In 1852 I published in the 'Annals and Magazine of Natural History' a sketch of a classification of recent Brachiopoda based upon internal organisation, giving a list of all the recent then known species. Similar and revised lists were subsequently published in 1859 by Professor E. Suess, in 1861 by Lovell Reeve and myself, and in

1870 and 1873 by Mr. W. H. Dall. I have in the above list given all the ranges of depth at present known to me; but of twenty-six species no information is given by the original authors, and later research has not revealed it. It is to be hoped that future dredging expeditions will supply the desiderata. It may also be stated that some twenty of the recent species have also been found in the upper tertiary formations. No permanent list of the recent species can at present be tabulated; but in order that the desired result may ultimately be attainable, it is necessary from time to time to lay before the public the progress that has been achieved in the right direction, pointing out at the same time the unavoidable deficiencies in our knowledge. The ranges in depth recorded in our list are even now sufficient to warrant us in arriving at certain general inductions. Thus, for the sake of argument we will put down the number of recorded species and named varieties at nominally 135, viz, 125 so termed species and 11 named varieties, a number which will certainly have to be hereafter reduced. As nothing is known respecting some 25 or 26 so called species, and which are given in the list, the number upon which we may venture to generalize would be about 107. In approximate numbers we find,

From shore to 500 fathoms, some.....	97	species.
Or named varieties, 12 of these range up to 1,000 fathoms or less.		
From 501 to 1,000 fathoms	16	„
Of these only one, *Discina Atlantica*, would range from 690 to 2,400 fathoms.		
From 1,001 to 1,500 fathoms	6	„
Of these *Ter. Wyvilli* ranges from 1,035 to 2,600 fathoms, the greatest depth at which any species has been found.		
From 2,501 to 2,000 fathoms	3	4
From 2,001 to 2,600 fathoms	3	„

Thus, out of 107 species or named varieties, some 57, or about half the known species, were dredged at depths of about 100 fathoms; 20 to 25 at low water mark, or from 5 to 10 fathoms; the larger number up to 50 or 60 fathoms. These facts indicate that the greater bulk of known species preferred to live at comparatively small or moderate depths, but few in depths ranging up to 500 fathoms, and that Brachiopoda are specifically rare at depths varying from 500 to 2,600 fathoms.

It must, however, in fairness be noted that the number of deep sea dredgings is small when compared with those made in seas of moderate depths; and, consequently, that a proportionably larger number of species may be hereafter expected when a larger area of oceanic abysses have been explored. I do not, however, anticipate that the general results will much alter the conclusions formulated in

the preceding pages. It is also evident that some species were capable of existing at a great variety of depth, for instance—

Platydia anomioides is recorded from	40 to	600	fathoms.
Rhynchonella psittacea from	10 „	690	„
Terebratula vitrea „	5 „	1,456	„
Discina Atlantica „	600 „	2,400	„
Terebratula Wyvilli „	1,035 „	2,600	„

The animal of the same species of Brachiopod is, moreover, capable of existing at different depths without any observable modification in shape and character. It has also been clearly ascertained that the Brachiopoda, although widely distributed, are very much localised, and usually occur in great numbers in their respective haunts.

If we examine the nature of the sea bottom, from which the 'Challenger' specimens were obtained, we find that they were dredged nine times from sea bottoms composed of rock and clay, once from stones and gravel, three times from sand, and eleven times from soft bottoms composed of mud, globigerina, or grey ooze; but as previously stated, as a rule they prefer rocky bottoms and coral reefs.

Out of the 30 or 31 species of Brachiopoda dredged during the 'Challenger' Expedition, ten or eleven appear to be undescribed.

1. *Terebratula Wyvilli, n. sp.*

This is a very interesting species of about 18 millimètres in length, by 17 in width, and 9 in depth, is nearly as broad as long, semi-transparent, smooth, and thin. It has a wide concave depression in the dorsal valve, and a fold in the ventral one with a small simple loop in the interior of the dorsal valve. It bears much external resemblance to several species of Waldheimia of the *W. carinata* group, but differs from the forms of that group by the shape of its loop. It was dredged at four stations, lat. 42° 41′ S., long. 134° 10′ E., depth 2,600 fathoms; in lat. 33° 31′ S., long. 74° 43′ W., depth 2,160 fathoms; lat. 42° 43′ S., long. 82° 11′ W., depth 1,450 fathoms; a small example was also got not far from Falkland Island, depth 1,035 fathoms.

2. *Terebratula Moseleyi, n. sp.*

The shell is broadly oval, semi-globose, and rather longer than wide, white and smooth, loop short, simple; length 23, breadth 21, depth 14 millims.

Five examples were obtained all about the same size. It seems to be a smaller species than *T. vitrea* and *T. Cubensis*, its nearest allies, is less elongated and not as convex. It was dredged west of Kerguelen Island, lat. 46° 47′ S., long. 51° 37′ E.; depth 210 fathoms.

3. *Terebratulina Wyvilli, n. sp.*

This is the most remarkable species of Brachiopod brought home

by the expedition. The shell is large, trigonal, broadest anteriorly, tapering posteriorly; valves moderately convex, somewhat flattened along the middle, and abruptly bent inwards close to the margin. The loop is short, simple, and rendered annular by the union of the oral processes. The surface of valves is marked by fine radiating lines; length 63, width 50, depth 35 millims.

A unique specimen of this fine species was dredged off Culebra Island, to the north-west of St. Thomas, in the West Indies, at a depth of 390 fathoms.

Terebratulina Wyvilli greatly exceeds in dimensions the largest known species of the sub-genus both recent and fossil.

4. *Terebratula or Terebratulina (?) Dalli, n. sp.*

Of this small shell only one dead specimen was dredged, measuring 8 millims. in length by $5\frac{1}{2}$ in width, and 4 in depth. The loop was incomplete, but seems to have been short as in Terebratula and Terebratulina. In shape the shell is longitudinally oval, thin, globose, glassy, and semi-transparent, slightly depressed anteriorly. Exteriorly the surface of valves is covered with fine radiating striæ, with shorter ones interpolated between the larger ones. It was dredged in lat. 34° 37′ W., long. 140° 32′ E.; depth 1,875 fathoms, together with *Discina Atlantica.*

5. *Terebratulina (?) Murrayi, n. sp.*

Of this species some eleven examples were dredged. It is a small shell not exceeding 4 millims. in length by $3\frac{1}{4}$ in width, and 2 in depth. In external shape it is obscurely trigonal, about as broad as long; broadest anteriorly, tapering posteriorly, white, surface marked by a small number of strong radiating ribs. Loop short, simple. Dredged, lat. 28° 33′ S., long. 177° 50′ W., near Kermadoc Isle, south of Fejee Isles, in a depth of 600 fathoms.

This is a remarkable and puzzling species, for while its shell and loop partake of the character of Terebratulina, its labial appendages seem to differ very materially from those of the sub-genus to which it is provisionally referred.

6. *Waldheimia Kerguelensis, n. sp.*

Of this fine species a great number of specimens were dredged by the 'Challenger' Expedition off Marion Island, west of Kerguelen Isle, in a depth of 100 fathoms, and also in lat. 50° 4′ S., long. 71° 22′ E., at a depth of 150 fathoms.

The shell is elongated oval, ventricose, smooth, yellowish-white; ventral valve deeper than the dorsal one, and more or less prominently keeled by the presence of a wide, slightly convex fold, and in the dorsal valve by a slight mesial depression or sinus commencing about

the middle of the valve and extending to the front, and more or less distinctly margined on either side by a faint raised line or ridge: beak incurved and truncated by a small circular foramen, loop long and reflected; length 44, width 34, depth 29 millims.

7. *Waldheimia Wyvilli*, *n. sp.*

Only one example of this shell was dredged off Valparaiso; lat. 33° 31′ S., long. 74° 43′ W., at a depth of 2,160 fathoms.

The shell is longitudinally oval, very thin, semi-transparent, smooth, light brownish-yellow; valves moderately convex, and rather flattened along the middle in dorsal valve. Loop long, reflected; length 19, width 14, depth 10 millims.

In external shape it somewhat approaches to *Waldheimia cranium*, but differs from it in several respects.

8. *Terebratella Frieli*, *n. sp.*

Shell small ovate, smooth, white; valves moderately convex, loop doubly attached; length 10, width 9, depth 5 millims. Two examples were dredged off Halifax, lat. 41° 15′ N., long. 65° 45′ W., in 1,340 fathoms; and two other specimens, which appear to be referable to the same species, near the Philippine Islands in from 82 to 102 fathoms.

I have felt much uncertainty with respect to the identification of this species. Dr. Gwyn Jeffreys considers it to be new, and to be referable to the genus *Terebratella*.

9. *Megerlia (?) incerta*, *n. sp.*

This is a new and very remarkable species. I did not like to sacrifice one of the two or three specimens in the attempt to develop the loop, and therefore am unable to pronounce any decided opinion as to the genus among the Terebratulidæ, to which it should be referred. The strong general resemblance it bears to *Megerlia truncata* induces me to provisionally leaving it in that genus. In external shape it is semi-circular, small, somewhat broader than long, hinge-line, straight, with obtuse cardinal angles, semi-transparent, whitish; valves very moderately convex, ventral valve a little deeper than the opposite one, and slightly longitudinally depressed along the middle; beak small and truncated by an incomplete circular foramen laterally margined by small deltidial plates; beak margin very sharply defined, leaving between them and the hinge-line a sharply defined narrow area; surface of both valves marked by numerous rounded radiating ribs; length 8, breadth 9, depth 4 millims. It was dredged in lat. 1° 47′ N., long. 24° 26′ W.

10. *Megerlia Willemoesi*, *n. sp.*

Shell oval or longitudinally oval, broadest anteriorly, tapering

posteriorly; valves moderately convex; surface smooth, white; length 10, width 9, depth 5 millims.

Five examples of this interesting species were dredged in lat. 36° 56′ S., long. 150° 30′ E., off Twofold Bay, South Australia, in 120 fathoms.

The other species of Brachiopoda, dredged in the 'Challenger' Expedition, have been already named along with the depths at which they were found. It is, however, somewhat remarkable that the 'Challenger' Expedition did not bring back any of those red-coloured species which are so abundant near New Zealand, Japan, and other southern places.

IX. "Electrodynamic Qualities of Metals.* Part VII. Effects of Stress on the Magnetization of Iron, Nickel, and Cobalt." By Sir William Thomson, F.R.S., Professor of Natural Philosophy in the University of Glasgow. Received May 22, 1878.

(Abstract.)

This paper commences with a detailed description of a series of experiments on the effects of stress on the magnetism of soft iron, of which some first results were described in a preliminary notice, communicated to the Royal Society on the 10th of June, 1875, and published in the "Proceedings." A few months later, the author found that he had been anticipated by Villari† in the most remarkable of those results—that showing increase or diminution of magnetization by longitudinal pull, according as the magnetizing force is less than, or greater than, a certain critical value.

In the first series of experiments described in this paper, the amount of the magnetizing force is varied through a range of values from zero to 900, on a scale on which about $12\frac{1}{2}$ is the value of the vertical component of the terrestrial magnetic force at Glasgow, and the effects of hanging on and taking off weights of 7 lbs., 14 lbs., and 21 lbs.,‡ in changing the induced magnetism, are observed. The experiments were made at ordinary atmospheric temperatures, and at temperature 100° C. The results are shown in curves, of which the abscissas represent the magnetizing forces and other ordinates, the change of magnetism produced by "ons" and "offs" of the weight while the magnetizing force is kept constant. The Villari critical value was

* Phil. Trans., 1875. † Poggendorf's "Annalen," 1868.

‡ The wire was of about 22 Birmingham gauge, weighing therefore about 14 lbs. per nautical mile. It was so soft that it had experienced a considerable permanent stretch by 21 lbs.; it would probably break with 30 or 40 lbs. Steel pianoforte wire of same gauge bears about 230 lbs.